
ENVIRONMENTAL Fact Sheet



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Ethylbenzene: Health Information Summary

Ethylbenzene is a clear, flammable liquid with a gasoline-like odor. It is naturally present in petroleum. Ethylbenzene is used mainly for the production of styrene. It is also used in the manufacture of dyes, rubber adhesives, paints and varnishes, as a constituent in asphalt and naphtha, and it is added to gasoline up to 2 percent by weight. The odor threshold for ethylbenzene in water is reported to be between 0.3 and 0.14 parts per million (ppm); the reported odor threshold in air is 2.3 ppm.

Health Effects

Absorption/Metabolism

In human and animal studies, ethylbenzene absorption by inhalation ranged from about 40 to 60 percent. In animal studies, absorption following ingestion was in the 70 to 90 percent range. One animal study found dermal absorption of ethylbenzene in mice to be about 3 percent. Ethylbenzene is not stored in the body; most of it is eliminated within two days after exposure.

Short Term (Acute) Effects

Experiments with human volunteers exposed by inhalation to ethylbenzene at high concentrations experienced effects including sleepiness, fatigue, headache, eye, nasal and throat irritation, chest constriction, tearing of the eyes, and difficulty in breathing.

Neurological effects have been seen in animal studies following acute exposure to high levels of ethylbenzene. These effects included impaired muscle coordination, salivation, and reduced activity.

Increases in some blood cell types (platelets and white cells) were observed in rats, but not mice or rabbits, exposed to ethylbenzene by inhalation for one month.

Long-Term (Chronic) Effects

Two hundred ethylbenzene production workers were monitored for a 20-year period for effects on the blood and liver. No adverse health effects were noted when compared to a non-exposed population.

Results of animal studies in several species have shown changes to the liver and kidney from inhalation exposure to ethylbenzene including biochemical alterations, tissue changes, and

increased organ weights. There is only one animal study available investigating oral exposure to ethylbenzene; toxic changes to the liver and kidney were associated with exposure.

In a two year inhalation study, rats exposed to ethylbenzene at the highest dose (750 ppm) had an increase incidence of tubule hyperplasia (abnormal tissue growth) of the kidney.

Reproductive/Developmental Effects

In a lifetime inhalation exposure study, an increase in testicular tumors (non-cancerous) was seen in rats exposed to ethylbenzene at the highest dose (750 ppm). A developmental malformation (extra ribs) was seen in two inhalation studies in which rat fetuses received an ethylbenzene dose via exposure to the mother.

Carcinogenicity (Ability to Cause Cancer)

There is sparse information available to make a decision whether ethylbenzene exposure can cause cancer in humans. There is one occupational study that investigated workers exposed to ethylbenzene by inhalation. Although there is no evidence of increased cancer incidence after twenty years of monitoring, this time frame is too short to detect some tumor types that can take a longer time to develop.

A lifetime animal study with ethylbenzene exposure by inhalation reported increased incidences of kidney and testicular tumors in male rats. The relevance of the animal study results to humans has not yet been determined. Ethylbenzene has been categorized by the Environmental Protection Agency (EPA) as a Group D carcinogen (inadequate evidence to classify).

Health Standards and Criteria

The EPA has established a Maximum Contaminant Level Goal (MCLG) for ethylbenzene in public drinking water systems. MCLGs are non enforceable health standards for drinking water. MCLGs are set at a level at which no adverse health effects would be expected to result from the consumption of two liters (0.53 gallons) of contaminated water per day by a 70 kg (154 lb) adult. The MCLG for ethylbenzene is 700 ppb (ppb = micrograms per liter or ug/l).

The EPA has also established a Maximum Contaminant Level (MCL) for ethylbenzene in public drinking water systems. MCLs are enforceable drinking water standards determined by balancing the adverse health effects of a particular chemical against the feasibility and cost of treating contaminated water. The MCL for ethylbenzene is also 700 ppb.

The Occupational Safety and Health (OSHA) enforceable standard (permissible exposure limit or PEL) for ethylbenzene in workplace air is 100 ppm averaged over eight hours.

For more information, please contact the DES Environmental Health Program, 29 Hazen Drive, Concord, NH 03302-0095; (603) 271-4608.

Suggested Reading and References

Casarett and Doull's Toxicology: The Basic Science of Poisons, Fifth Edition. Klaassen, C.D., ed. McGraw-Hill Publishing Co., Inc., New York, 1995.

Toxicological information on ethylbenzene. Integrated Risk Information System (IRIS). U.S. EPA, Office of Health and Environmental Assessment. Last significant revision 8/91.

Toxicological Profile for Ethylbenzene (Update). Agency for Toxic Substances and Disease Registry (ATSDR). Atlanta, GA. July, 1999.